

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

DATE: 9/12/88

MEMORANDUM

TO: AID/PPC/CDIE/DI, room 209 SA-18
FROM: AID/SCI, Victoria Ose *VO*
SUBJECT: Transmittal of AID/SCI Progress Report(s)

Attached for permanent retention/proper disposition is the following:

AID/SCI Progress Report No. 3. A-49
PR July 17 - April 88

Attachment

3A-49

PROGRESS REPORT

1. Report for the period July 1987 - April 1988
2. Grantee: Prof. J.M.R.S. Bandara
3. Address: Department of Agric. Biology
Faculty of Agriculture
University of Peradeniya
Peradeniya.
4. Grant No. USAID/02
5. Title of the Project: *Improving N fixation in grain legumes by selected strains of Rhizobia.*
6. Date of commencement of the project: August, 1986.

Rec'd in Sci. SEP 12 1988

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7. Research in progress:

7.1 Field studies

7.11 Wet zone (Meewatura)

Wet zone field experiments were conducted at the Meewatura field station during Yala 1987. Experiment was commenced on the 20th April, 1987. Soil samples were collected at the experimental site at 30 and 60 cm depth and were subjected analysis for Na, K, Ca, Mg, P and N. These were done by Atomic Absorption spectrophotometry. No gradient of nutrients were observed and therefore main factors considered at the trial layout were topography and shade factors. Most probable number method was used to obtain quantitative assessment of Rhizobial population.

7.12 Experimental design.

Details of the experimental design and treatments used were given under section 7.1 (b) in the previous progress report.

7.12 a. soil and plant sampling

Soil sampling was commenced at the time of seeding. Five soil samples were taken from each plot using a soil auger at 30cm depth. During the cropping period four plant sampling and three soil sampling was done as indicated below.

Sampling date	c r o p			
	cowpea		mungbean	
	soil	plant	soil	plant
0	18.5.87	-	19.5.87	-
20	2.6.87	2.6.87	8.6.87	8.6.87
40	23.6.87	23.6.87	29.6.87	29.6.87
60	13.7.87	13.7.87	20.7.87	20.7.87
80		3.8.87		3.8.87
		(yield)		(yield)

Soil analysis: Soil texture, soil pH, organic matter , CEC, Total N content and P status of soil were analyzed.

7.13 Plant analysis

The number of nodules from five plant samples from each plot were recorded separately. Fresh weight of roots and shoots were also taken. Plants samples were then oven dried at 55 oC for 2 days before recording the dry matter yield. P and N analysis of plant samples were done.

7.13 (a) Plant analysis for P

Vanadate - molybdate method was used determine the P content of plant samples. However in the midst of P analysis the spectronic 210 spectrophotometer failed. The instrument is still not functioning properly and we had to depend on equipment elsewhere. There is some more samples to be analyzed and it is expected to be completed by the end of this year.

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7.13 (b) Total plant N

Total N content of plant samples were determined by the microkjeldhal method using Auto Analyser. Results are summarized in Table 1.

7.14 Assessment of N fixation activity

N fixation activity of plants were assessed by acetylene reduction assay when plants are at 45 days. The root system with intact nodules were incubated in 100ml conical flasks where 10% of air were replaced with acetylene. After 2hours of incubation at room temperature samples of gas were taken from flasks in to preevacuated vaccutainers for storage. Ethylene levels were determined by Gas chromatography.

NOTE: IT WAS VERY UNFORTUNATE THAT THE OVEN CONTROL MECHANISM OF THE perkin Elmer sigma 3 B gas chromatograph FAILED AND AS SUCH WE WERE INTERRUPTED VERY BADLY. OUR EFFORTS IN TRYING TO MAKE THE GC FUNCTION PROPERLY HAS BEEN UNSUCCESSFUL.

It is expected that the GC will be ready for use by early July.

7.15 Statistical analysis

Third consecutive misfortune with the equipment occurred in early April probably with the higher load of work, the parity checking fault occurred in the computer. Repairs done at two different occasions in April were successful and we have now completed the analysis of the data available.

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Table 1 : Total N content in Mung bean plants inoculated with
TAL 209, MC6, CP30 at 3 levels of P

Days after planting	P level kg/ha	Rhizobial strains		
		TAL209	MC6	CP30
20	00	2.582	1.949	2.1042
	60	2.79	2.206	2.734
	180	2.814	3.305	4.009
40	0	2.3085	2.455	2.167
	60	2.466	2.549	2.457
	180	2.789	2.955	2.894
60	0	1.366	1.379	1.34
	60	1.433	1.516	1.482
	180	1.482	1.986	1.558

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Table 2 : Effect of P (TSP) on total N content in inoculated Cowpea

Days after planting	P level Kg/ha	Rhizobial strains		
		TAL209	YC6	CP30
20	0	2.9385	3.9052	3.898
	60	3.962	4.072	4.094
	180	4.137	4.232	4.083
40	0	2.1407	2.279	2.283
	60	2.696	2.298	2.723
	180	2.325	2.639	2.82
60	0	1.378	1.391	1.273
	60	1.548	1.406	1.678
	180	1.413	1.524	2.016

Table 3 : Effect of P(TSP) on nodule number in inoculated Cowpea

Days after planting	P level Kg/ha	Rhizobial strains		
		TAL209	CP30	YC6
20	0	4.22	5	4.9
	60	8.5	6.2	7.4
	180	14.03	14.8	9.92
40	0	7.04	6.85	7.77
	60	9.75	9.31	9.88
	180	14.213	19.07	16.87

Table 4 : Effect of P(TSP) on nodule number in inoculated Mung bean

Days after planting	P level Kg/ha	Rhizobial strains		
		TAL209	YC6	CP30
20	0	3.52	2.215	2.75
	60	5.98	4.525	4.68
	180	16.8	7.87	11.375
40	0	3.81	4.188	3.63
	60	6.18	4.8	6.25
	180	8.06	12.56	8.81

Fig 1. Effect of P on shoot dry weight of cowpea.

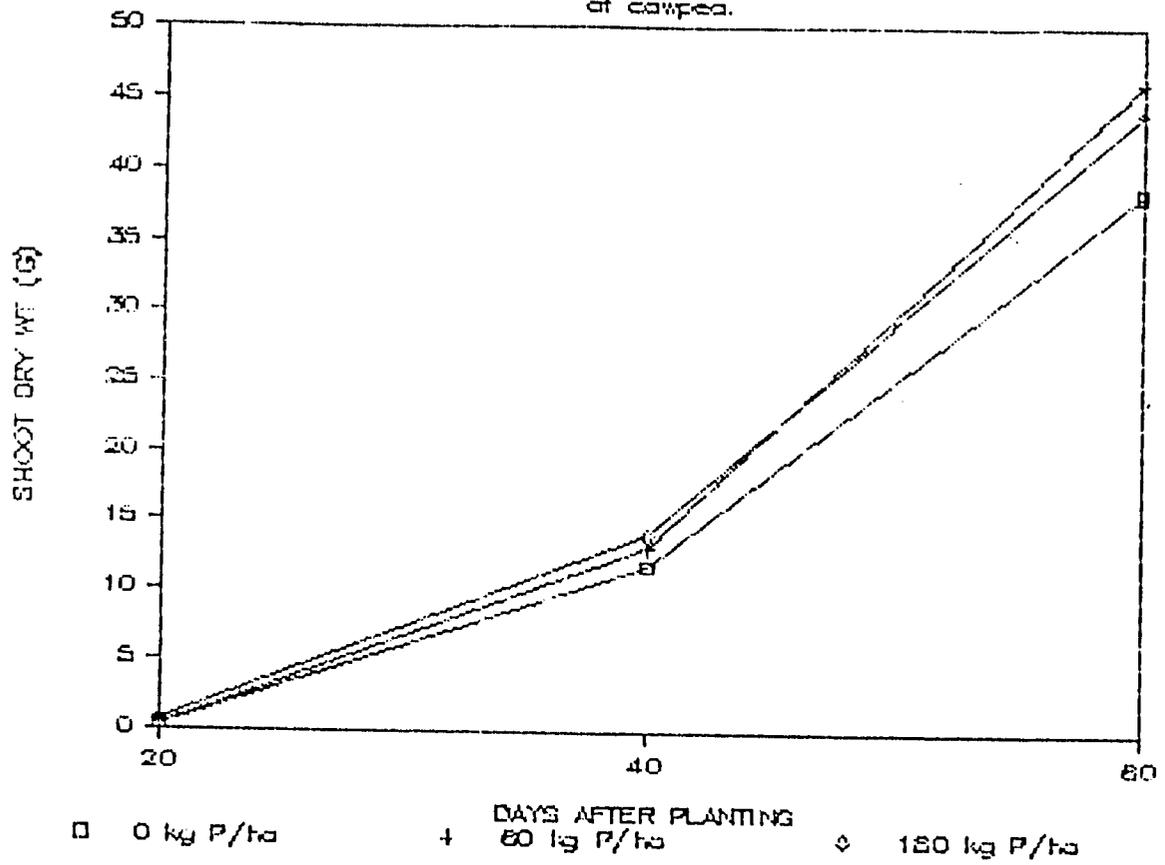


Fig 2. Effect of P on, shoot dry weight of cowpea inoculated with rhizobia YCS

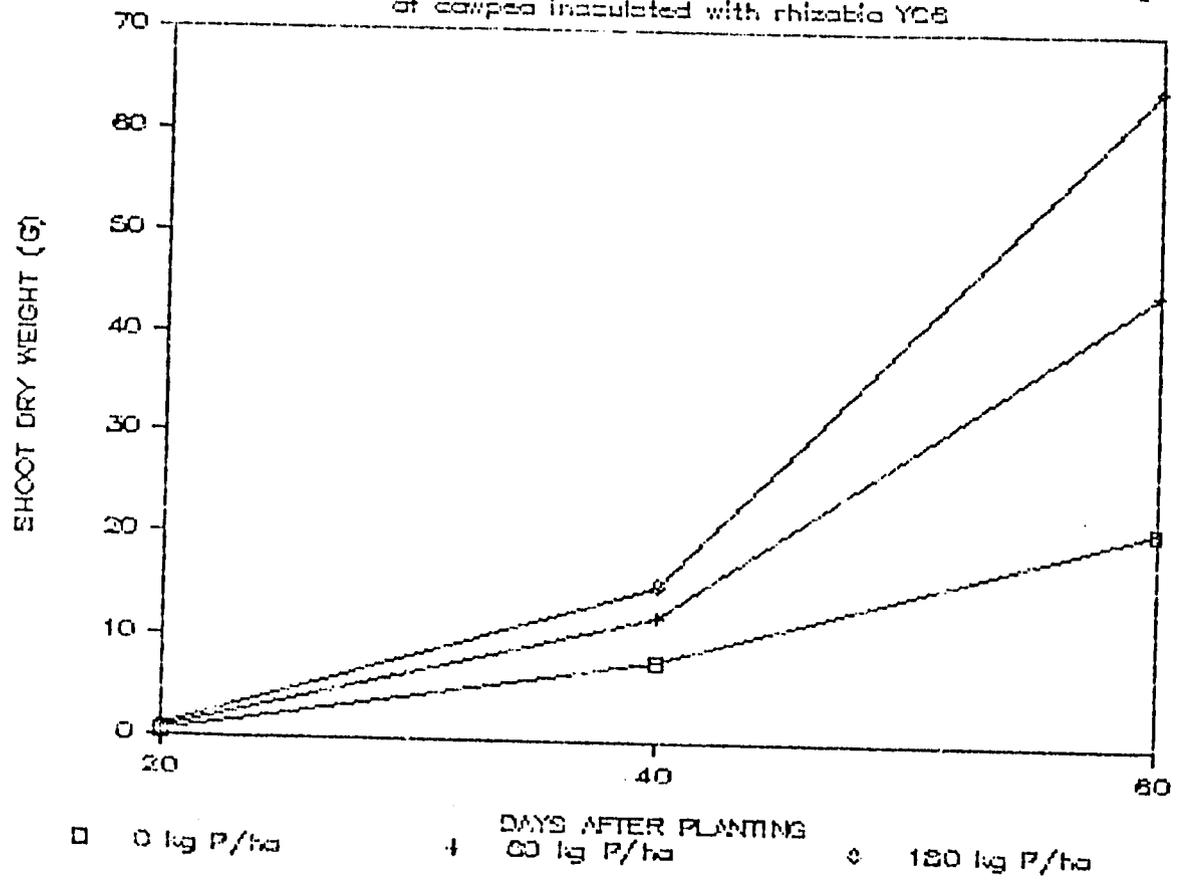


Fig 4: Shoot dry wt. of inoculated cowpea
at zero P level

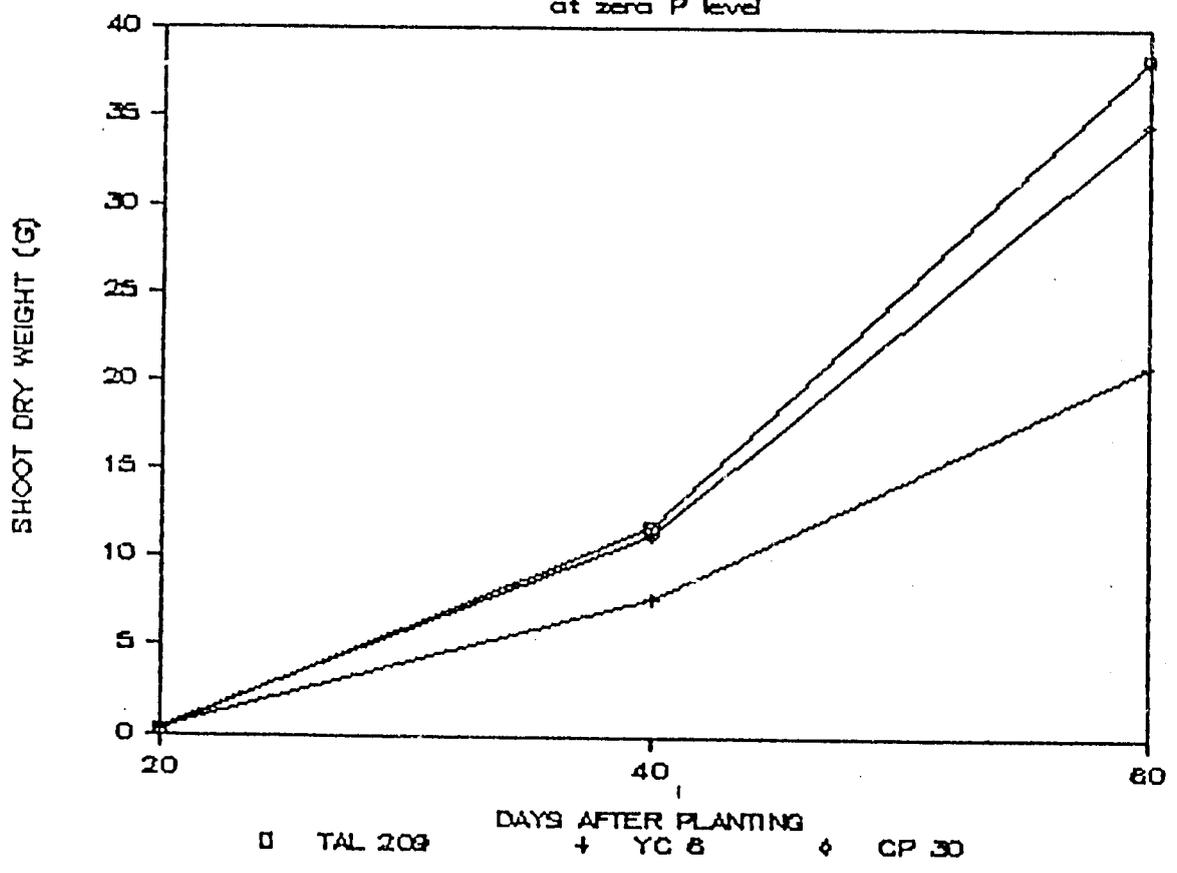


Fig 5 Shoot dry wt of cowpea inoculated with rhizobia and at 80 kg of P/ha.

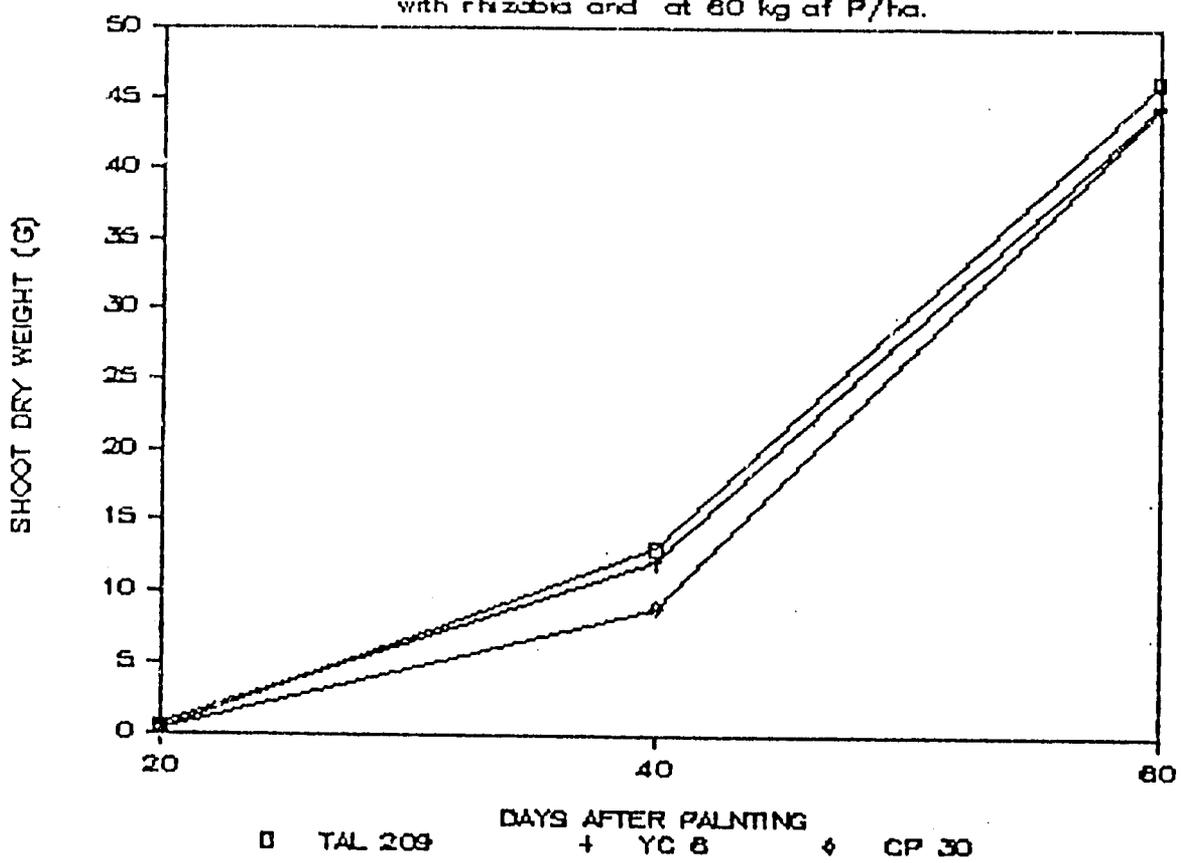
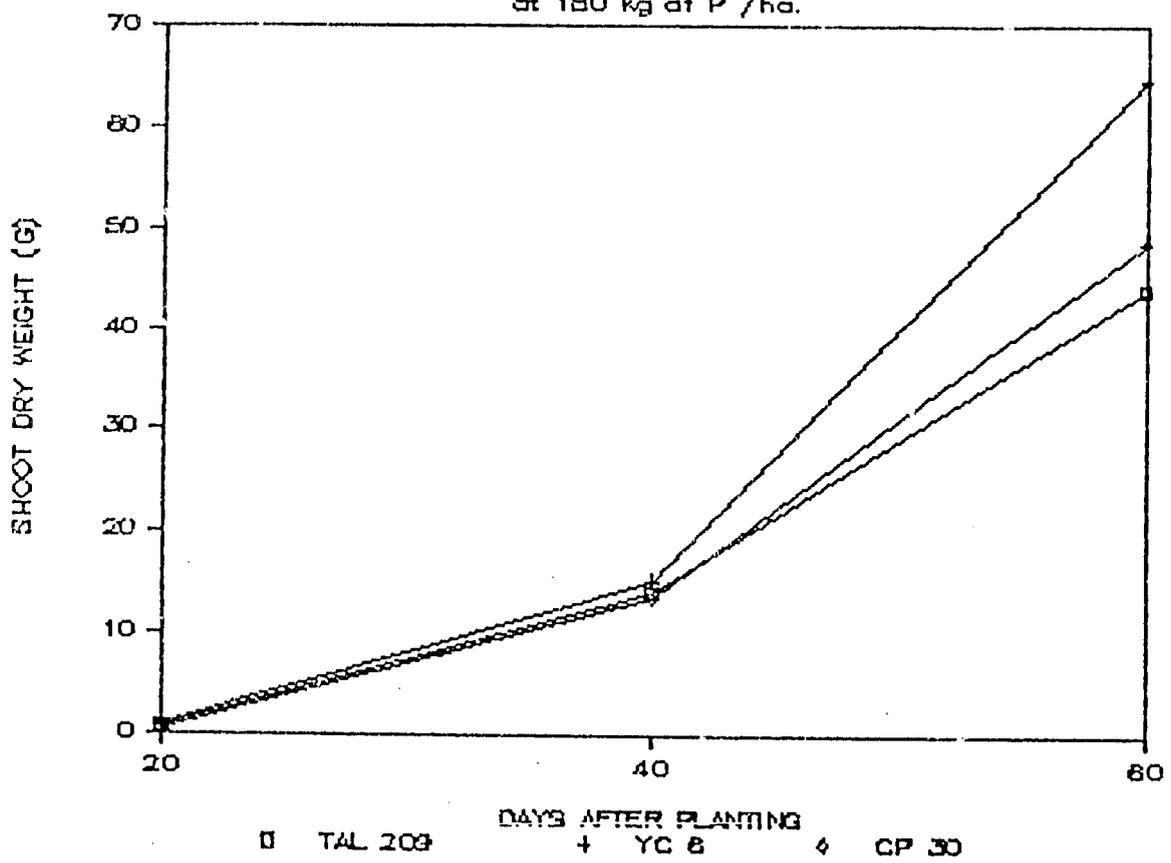


Fig.6 Shoot dry wt in inoculated cowpea
at 180 kg of P /ha.



7.2 Serology: Second set of experiments on antiserum production are in progress.

Acknowledgement

I wish to express my gratitude to officers of the NARESA, especially Mr. L.C. de S. Wijesinghe, the Additional Director, Ms. Swarna Prelis, Dr. Mahendra Watson, and to Mr. Oswin Silva of USAID, Colombo for the cooperative and helpful assistance provided.